

REMARKS

Applicants have carefully studied the outstanding Official Action. The present response is intended to be fully responsive to all points of rejection raised by the Examiner and is believed to place the application in condition for allowance. Favorable reconsideration and allowance of the application is respectfully requested.

Claims 1 - 12 are currently pending in the Application. In the present response, claim 1 is amended. Claims 2, 3 and 6 - 12 are cancelled without prejudice.

Claims 1 - 12 stand rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to point out and distinctly claim the subject matter which the applicants regard as the invention.

Applicants believe that the amendments and remarks provided below clarify the subject matter which the applicants regard as the invention and specifically clarify the meaning of the phrase 'extending along at least most of...portion'.

Claims 1, 2, 4, 5, 7 and 8 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Felsenheld et. al. (U.S. 3,852,759).

Claims 3, 6 and 9 - 12 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Felsenheld et. al. in view of Balzono et. al. (U.S. 4,800,395).

Felsenheld et. al. describes a broadband tunable antenna especially suitable for use on moving vehicles.

Balzono et. al. describes a high frequency helical antenna, which includes a half wave helical element RF coupled to a monopole element.

The Examiner interprets the bar conductor (1) and helical radiating element (2) of Felsenheld to read on the cylindrical radiating element and helical radiating element respectively of the present invention. However, the bar conductor of Felsenheld may be located either within or entirely outside of the helical radiating element (col. 1, lines 53 - 56) but does not enclose the helical radiating element, as does the cylindrical radiating element of the present invention.

Claim 1 has been amended to recite this feature of the present invention more clearly. The enclosure of the helical radiating element by the cylindrical radiating element is an important feature of the present invention since it allows the helical radiating element to act as a  $\frac{1}{4}$  wavelength impedance transformer, which matches the output impedance of the device, which is 50 Ohms, to the impedance at the base of the helical element, which is far lower.

Furthermore, the bar conductor of Felsenheld extends along the entire length of the helical radiating element (see Fig. 1, for example). This is necessary because Felsenheld's antenna is a loop antenna and so the bar radiator must extend fully along the length of the helical radiating element so as to complete the loop structure. This is in contrast to the present invention wherein the cylindrical radiating element extends along only a portion of the helical radiating element, whereby impedance matching between the impedance of the portion of the helical radiating element extending outside of the cylindrical radiating element and the impedance of a radio device to which the antenna is attached is facilitated. The bar radiator in Felsenheld has a different function, namely to propagate waves and connect the helical element to a capacitor, which function is served by its extending the whole way along the helical radiator.

Thus, there is no suggestion in the prior art of Felsenheld of the bar conductor enclosing the helical radiating element or extending along only a specific portion of the helical radiator, as recited in amended claim 1.

Furthermore, the Examiner interprets element 61 of Felsenheld to read on the dielectric separator between the cylindrical radiating element and helical radiating element of the present invention. However, element 61 is an insulating hole in the wall of the bar element through which a lead passes. It is therefore not clear how this reads on the dielectric separator of the present invention.

Furthermore, with regards to Balzono et. al., the Examiner cites Balzono as resolving the level of ordinary skill in the art regarding the use of a dielectric separator to prevent the shorting of conductors. In Balzono, a dielectric insert 140 is employed in order to separate an outer conductor 110 from an inner conductor 120. However, in the present invention the dielectric insert does not serve to separate the helical radiating element from another conductor, since there is no other conductor

within the helical radiating element. The level of skill in the art regarding the use dielectric separators to prevent shorting would therefore not seem to be relevant. Rather, the dielectric insert of the present invention provides mechanical stability by being configured to maintain the winding pitch of the helical radiating element and also serves to reduce the length of the transmission line.

Thus, the level of skill in the art resolved by Balzono does not pertain to the art employed in the dielectric insert of the present invention.

Applicants have amended claim 1 to include the recitation that the cylindrical radiating element is located exterior of the helical radiating element and encloses the helical radiating element, which as discussed above is not shown by any of the prior art of record.

Applicants have further amended claim 1 to recite the presence of a dielectric separator located between the helical radiating element and the cylindrical radiating element and a dielectric insert located interior of the helical radiating element and being configured to maintain the first winding pitch of the first longitudinal portion of the helical radiating element, which as discussed above is not shown by any of the prior art of record.

In addition, Applicants have amended claim 1 to include the recitation that the helical radiating element and cylindrical radiating element provide a coaxial conductive path between the base of the helical radiating element and portion of the helical radiating element extending beyond the cylindrical radiating element, in order to clarify the function of the helical and cylindrical radiating elements.

Support for the amendments to claim 1 is found in paragraphs [0019] - [0022] as well as Fig. 2C of the Application as published.

Applicants respectfully submit that the antenna as recited in amended claim 1, including, inter alia, a cylindrical radiating element located exterior of the helical radiating element and being generally coaxial with and enclosing of the helical radiating element, a dielectric separator located between the helical radiating element and the cylindrical radiating element and a dielectric insert located interior of the helical radiating element and being configured to maintain the first winding pitch of the first longitudinal portion of the helical radiating element is not shown or suggested by prior art, either alone or in combination, and that amended claim 1 is therefore patentable.

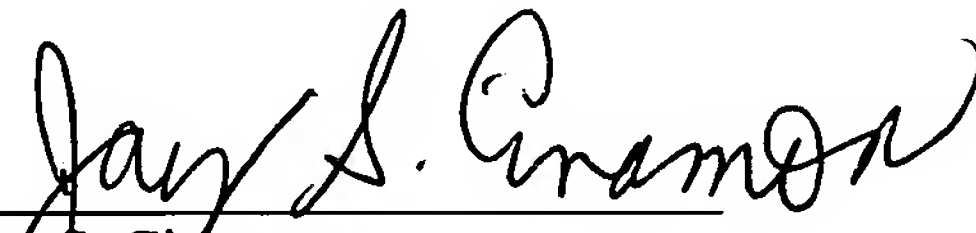
Claims 4 and 5 each depend directly from claim 1 and recite additional patentable subject matter and therefore are allowable.

In view of the foregoing remarks, all of the claims are believed to be in condition for allowance. Favorable reconsideration and allowance of the application is respectfully requested.

Please charge any fees which may be due to our Deposit Account No. 01-0035.

Respectfully submitted,

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